

### **REMARKS**

Reconsideration of the above identified application is respectfully requested. Claims 1-88 are in pending in this case.

#### **Amendments to the Claims**

Independent claims 1, 12, and 71 have been amended to recite the alkylstyrene content being limited to not more than 20 wt%, and the m value is from less than 30.

Claim 23 was amended for clarity, as was claim 43.

#### **New Matter Rejection**

Applicants previous amendment, filed 8/2/2007, has been objected to as introducing new matter into the specification – specifically, the amendment to the definition of **F**.

It is held the original specification fails to support an amendment disclosing the isoolefin-alkylstyrene-isoolefin triad “as a component of the relationship for **F** and its associated range value for **m**.” Paragraph [00211] is specifically cited in the objection – it is held that this paragraph only supports an **A** component relating to isoprene and isobutylene with no mention of alkylstyrene. It is also held the **F** relationship set forth in paragraph [00211] is not the one recited in the claims.

Applicants respectfully disagree with both these holdings for the following reasons.

Of first note: paragraph [0017] defines the terms **B** and **S** as respectively: isobutylene (an isoolefin) and p-methylstyrene (an alkylstyrene). It is noted in the rejection that the triad is described in two different ways: alkylstyrene-isoolefin-alkylstyrene and isoolefin-alkylstyrene-isoolefin. So these two triads may be referred to as, respectively, an **SBS** triad and a **BSB** triad.

In the amendment of 8/2/2007, Applicant made amendments so that the disclosed and recited definition of **F** is the triad fraction of the isoolefin-alkylstyrene-isoolefin triad (the **BSB** triad) in the copolymer. The sequence distribution equation itself -  $F = 1 - \{m A / (1 + mA)\}$  - in both the specification and claims was not amended.

Original paragraph [00211] of the specification is reproduced below.

[00211] For the purposes of this invention, the relationship between the BSB triad fraction and the mol% p-alkylstyrene incorporated into the copolymer is described by the copolymer sequence distribution equation described below and is characterized by the copolymer sequence distribution parameter, m,

$$F_{BSB} = 1 - \{m A / (1 + mA)\}$$

where: m is the copolymer sequence distribution parameter,

A is the molar ratio of isoprene to isobutylene in the copolymer, [pMS]/[IB] and,

F<sub>BSB</sub> is the BSB triad fraction in the copolymer.

Clearly, this paragraph, contrary to the assertion in the rejection, discloses a BSB triad fraction, states that the equation is the relationship between the BSB triad and the % alkylstyrene in the copolymer, F has a subscript of BSB, and the definition of F states that it is the BSB triad fraction in the copolymer. As BSB is shorthand for isoolefin-alkylstyrene-isoolefin, there is clear support for Applicants prior amendments. No new matter has been introduced into the specification.

If anything, an analysis of paragraph [00211] shows an error in the written definition of A. The definition of A shows a conflict between the word definition of A and the mathematical definition of A. The word definition is as stated in the Office Action objection – A relates to isoprene and isobutylene. However, the mathematical definition of A is [pMS]/[IB] – the ratio of p-alkylstyrene to isobutylene.

Given that the written description of the F equation states that the equation describes the relationship between the BSB triad fraction and the mol% p-alkylstyrene, and all other definitions of A in the specification and original claims disclose A as the molar ratio of p-alkylstyrene to isobutylene, one skilled in the art would appreciate that the word definition of A in paragraph [00211] is not the correct definition – the mathematical definition is the correct definition. Hence the new amendment made to paragraph [00211]. Also, it is then noted that the objection is based on a faulty premise – the obvious incorrect word definition of A.

Also, it is held that the **F** relationship as set forth in paragraph [00211] is not the same as that recited in the claims. This is incorrect. There is only one **F** relationship, expressed as an equation, set forth in the present application. A comparison of the paragraph and the claims shows that this is the same relationship.

Rejection under 35 U.S.C. § 112, first paragraph

Claims 1-88 stand rejected under 35 U.S.C. § 112, first paragraph for failing to comply with the written description requirement. Specifically, the claims are rejected for asserted new matter.

Applicant respectfully disagrees. As argued above, the recitation of **F** being the fraction of BSB triad in the copolymer is clearly supported in the original paragraph [00211]. In fact, it is hard to understand how the statement “**F**<sub>BSB</sub> is the BSB triad fraction in the copolymer” can be interpreted as anything but what Applicant is now claiming.

It is requested that this rejection be withdrawn.

Rejections over Powers (US 5,162,445)

All claims, excluding claims 65 and 66, stand rejected, under one or more statute, over Powers.

*35 U.S.C. § 102(b)*

Applicants previous arguments were considered to “ignore the foundation of the rejection” – that as the level of pMS in the polymer of Powers is increased, per the trend suggested in Table 26, the value of *m* would decrease to the recited value of less than 38.

Applicants disagree. As discussed in the prior arguments, continual increase of the pMS level in the copolymer of Powers will not always, or inherently, result in a lower *m* value. As previously noted, alkylstyrene units have a preferred tendency to follow each other in a copolymer chain, so as the mol% of pMS in the copolymer increases, the methylstyrene units will have a greater tendency to be adjacent, rather than isolated between isoolefin units in a BSB triad. So, at some point of pMS level, the BSB triad fraction will decrease to such a level that the *m* value actually starts to increase. For example, at a 30% mol pMS level, with a presumed 5% BSB (not an unreasonable assumption based on Table 26 and how the **F** value drops with increased pMS), the resulting *m* value is actually 44.

So, for polymerization in methyl chloride as disclosed by Powers, at some point between 23 and 30 % pMS and 9 and 5 % BSB triads, if the value of m were to be graphed against the percentage of pMS, there is an inflection point and the value of m begins to increase as pMS levels are further increased.

Applicant have made a direct comparison of a copolymer as described by Powers (Example 149 in the specification) and the copolymer of the present invention (Example 150). As seen in Table 26, for pMS levels within the recited range, the value of m is above the recited value. Thus, Powers fails to anticipate the recited invention.

*35 U.S.C. § 102(b) or alternatively, obvious under 35 U.S.C. § 103(a)*

All of the arguments set forth above are applicable herein, and are hereby incorporated herein by reference.

In the present Office Action, Applicant's prior arguments are dismissed as focusing on the BSB% change due to the diluent selection, rather than identifying any polymer properties of the present invention that are different from that of Powers. Applicant respectfully disagrees with this and the present rejection for the following reasons.

First, the BSB triad % in the copolymer is a polymer property – it is one way of describing the physical structure of the resulting polymer. Thus a discussion the BSB triad % was proper.

Second, for claims reciting product-by-process limitations, nonobviousness of the recited invention over what appears to be the same product by a different process is established by a showing of a physically different product due to the different process. By the previously provided Graphs, and the data provided in the original specification wherein a copolymer of the type disclosed by Powers is directly compared to the recited copolymer, Applicants have shown that the recited process results in a physically different copolymer and that at each level of pMS in the feedstock and in the copolymer, the BSB triad % and the resulting m value is different – yielding a physically different product than that disclosed by Powers. As discussed in the present application, one skilled in the art might expect a general pattern of decreasing mol% of BSB with an increased amount of alkylstyrene, one would not expect a higher mol% of BSB in the copolymer that occurred with a diluent change.

In the prior office action, it is held that even if there were a change, any change would be obvious or insignificant over the teachings of Powers. However, no additional prior art or

particular teachings in Powers are noted to show that the above discussed change would have been obvious to one skilled in the art.

As Powers fails to anticipate the copolymer recited and fails to render the copolymer made by the recited process obvious, it is requested that this rejection be reconsidered and withdrawn.

*35 U.S.C. § 103(a)*

Regarding the halogenation or functionalization claims held as obvious over Powers, the above statements are also applicable as the halogenation or functionalization of the isoolefin-alkylstyrene copolymer occurs after formation of the copolymer. As Powers fails to anticipate or render obvious the copolymer having the recited combination of alkylstyrene content and m values as presently recited, Powers also fails to anticipate or render obvious halogenation or functionalization of the recited copolymer.

It is requested that in light of the above remarks that the rejections of the claims over Powers be reconsidered and withdrawn.

In view of the above amendments and remarks it is respectfully submitted that the claims in this case are in condition for allowance. Prompt notice of allowance is respectfully solicited.

Respectfully submitted,

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Date

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